

Competence Improvement of Visual Basic Programming Through Project-Based Learning

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Abstract: the purpose of this study is to improve the competence of students in the field of visual basic programming through project-based learning. The low level of students' understanding and lack of skills related to visual basic programming are obstacles faced in facing the Industrial Revolution 4.0. The study was conducted with research subjects of 48 students in polytechnic of diploma III program of Negeri Media Kreatif-Medan. This research is a Research and Development with ADDIE development method (Analysis, Design, Development, Implementation and Evaluation). Data analysis is by observation technique and processed descriptively. Based on the results of the research conducted, the implementation of the project based learning model is able to improve the competence of students in the field of visual basic programming so that their expertise is in line with the needs of industry 4.0. Other findings from this study indicate that there is an increase in creativity and critical thinking of students in solving problems in visual basic learning using desktop-based visual basic programming tools.

Keywords: Competency Improvement, Visual Basic Programming, Project-Based Learning.

1 INTRODUCTION

Education is the main capital of developed countries. Advanced education will produce quality resources and have a positive impact on the progress of the nation. One of the government's efforts to continue to be responsible for improving education is to establish educational facilities, Starting from early childhood education to college[1]. Various attempts were made by the government to realize graduates who have critical thinking skills as expected[2]. Among them are critical thinking skills, improving learning outcomes, quality and having skills, even this effort has been mandated in Law No. 20 Article 35 of 2013 concerning national education. (1). National education standards consist of standards of content, process, competency of graduates, education staff, facilities and infrastructure, management, financing, and assessment of education that must be improved in a planned and periodic manner[3]. (2). National education standards are used as a reference for curriculum development, education personnel, facilities and infrastructure, management, and financing. (3) Development of national education standards and monitoring and reporting of their achievements nationally carried out by an institution of standardization, guarantee or assurance and quality control of education[4]. Education in Indonesia has not been fully able to drive the progress of the nation according to the Association of Educational Institutions of Indonesian Private Education Personnel ALPTKSI (2018). All educational institutions of teaching staff (LPTK) are standardized have not had laboratory schools yet, industrial partner schools, and infrastructure. Based on a 2015 United Nations Educational, Scientific, and Cultural Organization (UNESCO) survey of the quality of education in developing countries in the Asia Pacific, Indonesia ranks 10th out of 14 countries whereas, for the quality of teachers, the quality is at level 14 of 14 developing countries[5]. One of the factors of the low quality of education in Indonesia is due to lack of critical thinking skills. Critical thinking skills are one of the most important goals in all education sectors. Therefore, the level of low-level skills learning must change the concept of learning into high-level learning skills, especially critical thinking skills, namely skills to solve a problem[6]. With the development of science and technology so that according to Patmawati in line with the

emergence of diverse information, both the source and the essence of the information, critical thinking skills are very important to have to improve learning outcomes[7][8][9][10]. Efforts to improve students' critical thinking skills need to apply a learning approach that allows students to observe and explore in order to build their own knowledge. the foundation of thinking in learning which states that knowledge constructivism is carried out by students themselves, with the lecturer as a facilitator tasked with creating a supportive learning atmosphere. In constructivism classes a lecturer does not teach students how to solve problems, but presents problems (encourages) students to find their own ways of solving problems[11]. Learning that does not support efforts to improve critical thinking skills of students is emphasized to memorize. Students are very easy to forget the material that has been studied before (Redhana, 2008) therefore, a teacher must be able to direct and explore the potential that exists in students, so that students are able to develop certain skills including critical thinking skills through the application of approaches, models, or the right method in learning activities. According to Afrizon in Arum the criteria for critical thinking can be grouped into five indicators, namely 1) elementary clarification; 2) give reasons for a decision (the basic of the decision); 3) inference; 4) further clarification (advanced clarification); 5) allegation and cohesiveness (strategy and tactic)[12]. The learning model that occurs at this time is learning that is more centered on lecturers (teacher centered learning). This learning model is not appropriate to be practiced in the current visual programming course. Because the method used is the lecture method which emphasizes the understanding of concepts or theories. This causes boredom for students when lectures take place and makes students not interested in learning, so that students' creativity is not visible and the experience they gain from the learning process has not been able to build critical thinking skills and also has not been able to improve learning competence[13]. Therefore, to improve the ability of students of the Graphic Design Department at Polytechnic of Negeri Media Kreatif-Medan, a case study-based Project Based Learning (PPA) model needs to be given. Project-based learning is a learning model that requires instructors to develop guiding questions to students.

Considering that each student has a different learning style, this learning approach provides an opportunity for students to explore material using various methods that are meaningful to themselves, and conduct experiments collaboratively. This allows each student to finally be able to answer guiding questions. The development of the Project Based Learning (PPA) model is important to be used to overcome the problem of students' critical thinking skills, and to show a positive influence on students from aspects of student learning achievement and thinking skills. Project Based Learning (PjBL) is not only beneficial in improving students' critical knowledge and thinking skills, but is also able to support the development of problem solving skills, working skills in groups, and communication skills, Project Based Learning Model[14]. After conducting research in the field, it is necessary for the media to deliver assignments to students on a project basis to work independently using a desktop-based Visual Basic programming language, so it can be seen the results of student self-recorded projects perfectly and can be measured to see whether student grades increase or not increase[15].

2. METHODOLOGY

This research uses the Resit and development (R & D) method with the instructional design model of ADDIE (design analysis of evaluation development implementation).

3. RESULT AND DISCUSSION

In accordance with the theoretical studies that have been stated previously, there are several Steps in the Learning Method of Case Study, i.e.

1. Syntax

Model of Project Based Learning (PPA) in the course of visual programming, the Graphic Design Study Program in accordance with the learning model according to Joyce & Weil, (1982), has five stages namely (1) syntax, namely the operational steps of learning, (2) the system social, is the atmosphere and norms that apply in learning, (3) principles of reaction that describe how teachers should view, treat and respond to students, (4) support systems means that all means, materials, tools, or learning environments are support learning, and (5) instructional and accompaniment factors, namely learning outcomes obtained directly based on objectives set (instructional effects) and learning outcomes that come from outside the set (nurturant effects). The learning model mechanism and procedure are arranged according to the course specifications as follows:

- a. Learning activities are designed in the planned documents of RPS and SAP;
- b. RPS is a learning activity that contains the objectives of the learning process and expected competencies with the meaning that the learning outcomes are compiled to support the achievement of cognitive, affective and physical competencies.
- c. Each course must have a RPS, while SAP can be developed by lecturers according to their needs;
- d. RPS and SAP are endorsed by the head of the study program at the beginning of the semester, before

learning begins;

- e. The form of exploration activities can be done through demonstrations, discussions, lectures and related to the design of this learning model is Project Based Learning (PjBL)

The following table is the syntax or sequence of Project Based Learning (PPA) learning model activities using a seven-step syntax: The characteristics of the learning model of project-based learning of case-based studies (PPA) in learning programming in vocational education are compiled based on case studies with a form of explanation based on.

1. Case selection: in case selection it should be intended but not in a random way. Cases can be chosen by researchers by making people objects such as the environment, programs, processes, and society or social units.
2. Data collection: There are a number of data collection techniques, but the ones most widely used in this case study are observation, interviews, and documentation analysis. The researcher as a research instructor, can adjust the way data collection is based on the problem and research environment, and can collect different data simultaneously;
3. Data analysis: after data is collected; researchers can aggregate, organize, and classify data into manageable units. Aggregation is the process of abstracting specific things into general matters in order to find general patterns of data. Data can be chronologically organized, categorized or entered into typology.
4. Refinement: even though all data has been collected, in the case study approach, improvements should be made or reinforcement of new data against the categories that have been found. New data collection requires researchers to return to the field and create new categories because new data cannot be grouped into existing categories;
 - a. Report writing: reports should be written communicatively, easily read, and clearly describe a condition or social unity, making it easier for readers to understand all important information.

While the step of PjBL consists of six steps:

1. Determinating of the fundamental questions (start with the essential question)
2. Designing a plan for the project
3. Creating a schedule
4. Monitoring the students and the progress of the project
5. Assessing the outcome
6. Evaluating the experience

The seven syntaxes of PjPL are as follows:

Syntax 1: Determining the Case Study Project.

In this syntax, the lecturer determines the theme or topic of the project based on the case study given by the lecturer. Students are given the opportunity to determine case studies either done in groups or individuals with a note that they do not leave the assignment given from the lecturer.

Syntax 2: Identifying the Problem

In this syntax, students identify cases given by lecturers

individually or in groups. Based on the case, students collect various important problems, find what is considered a problem, and determine the importance of the problem for themselves individually or in groups. The task of the lecturer at this stage is to motivate students to be able to find problems so that students collect from various subject matters if they can find answers.

Syntax 3: Making a Project Proposal

In this syntax, students submit proposals based on the designed activities in writing and are explained in detail to make a project produced

Syntax 4: Designing Prototype

In this syntax, students already have knowledge of workflow in the process of making applications using visual programming that will be demonstrated in accordance with the steps of the workflow that has been set.

Syntax 5: Implementing the Project

In this syntax, students make a prototype project so as to produce an application according to the required specifications, so that it will show the competency of students from the results obtained.

Syntax 6: Implementation

In this syntax, students apply the results of the project that has been generated in the form of a demonstration application

Syntax 7: Project Report Presentation

In this syntax, the prototype that has been made finishing and has shaped the application, then students present the results of the project. Afterward, the application is submitted to the instructor for a final assessment, which is that the resulting application will be given an assessment including affective, cognitive, and psychomotor, so that it will show students who follow the learning process of visual programming practices will have an impact on the product results produced by students.

4. CONCLUSION

Development of Project-Based Learning (PPA) models as a supporter of visual programming courses in the Vocational Education at Polytechnic, Negeri Media Kreatif-Medan. It has been designed in accordance with the support of behaviorist theory, with the aim of developing students' expertise competencies in the Diploma III of Graphic Design study program. This model is designed to contribute to overcoming learning problems in Visual Programming at the Polytechnic, Negeri Media Kreatif-Medan. With learning objectives is that can be achieved practically and effectively. This model is also an innovation in learning Desktop-based Visual Basic programming and can also be applied to other courses and colleges. Between expectations and reality is the main consideration for choosing Project Based Learning (PjBL) as a recommended model to overcome the gaps that occur. Validation and experimental tests will form the basis of the design of this model so that it can be widely implemented in

the development of Technology and Vocational Education (PTK) institutions in Indonesia.

5. REFERENCES

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